

IN THE UNITED STATES  
PATENT AND TRADEMARK OFFICE

Patent Application

**Appellant(s):** Bhandari et al.

**Case:** R. Bhandari 1-14-3 (LCNT/126025)

**Serial No.:** 10/797,922

**Group Art Unit:** 2616

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**Examiner:** Chery, Dady

**Title:** METHOD, APPARATUS AND SYSTEM FOR GUARANTEED  
PACKET DELIVERY TIMES IN ASYNCHRONOUS NETWORKS

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SIR:

**APPEAL BRIEF**

Appellants submit this Appeal Brief to the Board of Patent Appeals and Interferences on appeal from the decision of the Examiner of Group Art Unit 2616 mailed December 28, 2007 finally rejecting claims 1-24.

In the event that an extension of time is required for this appeal brief to be considered timely, and a request therefor does not otherwise accompany this appeal brief, any necessary extension of time is hereby requested.

Appellants believe the only fee due is the \$510 Appeal Brief fee which is being charged to counsel's credit card. In the event Appellants are incorrect, the Commissioner is authorized to charge any other fees to Deposit Account No. 20-0782/LCNT/126025.

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**Real Party in Interest**

The real party in interest is LUCENT TECHNOLOGIES INC.

**Related Appeals and Interferences**

Appellants assert that no appeals or interferences are known to Appellants, Appellants' legal representative, or assignee which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**Status of Claims**

Claims 1-24 are pending in the application. Claims 1-24 were originally presented in the application. Claim 1 has been amended. The final rejection of claims 1-24 is appealed.

**Status of Amendments**

All claim amendments have been entered.

### **Summary of Claimed Subject Matter**

Embodiments of the present invention are generally directed to guaranteeing delivery times for data packet communication in an asynchronous network. More specifically, one embodiment of the invention provides a method for guaranteeing delivery times of data communicated between communication devices of an asynchronous network. The method includes generating a global timing schedule for synchronizing communications between the communication devices. The method further includes generating one or more triggers that cause data to be transmitted and received, according to the generated global timing schedule.

For the convenience of the Board of Patent Appeals and Interferences, Appellants' independent claims 1, 11 and 19 are presented below with citations to various figures and appropriate citations to at least one portion of the specification for elements of the appealed claims.

Claim 1 positively recites (with reference numerals, where applicable, and cites to at least one portion of the specification added):

1. (previously amended) A method for guaranteeing delivery times of data communicated between communications devices (210) of an asynchronous network (200) comprising:
  - generating a global timing schedule (600) for synchronizing the communication between said communications devices (210);
  - generating at least one trigger; and
  - in response to a generated trigger, transmitting and receiving data according to the global timing schedule (600).

Support for the elements of claim 1 can be found at least from the following sections of Appellants' specification: page 3, lines 12 – 26; page 6, line 6 – page 7, line 3; page 8, line 19 – page 13, line 16; page 13, line 25 – page 14, line 6; and page 15, line 7 – page 18, line 5; and Figs. 2 and 4 – 7.

Claim 11 positively recites (with reference numerals, where applicable, and cites to at least one portion of the specification added):

11. (original) A network interface controller for triggering data communication between communications devices (210) of an asynchronous network (200) having guaranteed delivery times, comprising:

a counting device (370) for generating a signal in response to counting a predetermined number of counts;

a transmit trigger generator (310) for receiving the signal from said counter and, in response, generating a transmit trigger signal;

a transmit memory device (320), for storing data to be transmitted;

a transmit memory manager (315) for receiving the transmit trigger signal from said transmit trigger generator (310) and, in response, directing at least a portion of said data stored in said memory device (320) to a transmission device (325) for transmission of said data;

a receive trigger generator (350) for receiving the signal from said counter (370) and, in response, generating a receive trigger signal;

a receive memory device (340), for storing received data; and

a receive memory manager (335) for receiving the receive trigger signal from said receive trigger generator (350) and, in response, directing received data to a location within said receive memory device (340).

Support for the elements of claim 11 can be found at least from the following sections of Appellants' specification: page 6, line 6 – page 7, line 3; page 7, line 26 – page 14, line 6; and Figs. 2 and 4-5.

Claim 19 positively recites (with reference numerals, where applicable, and cites to at least one portion of the specification added):

19. (original) An asynchronous network (200) having guaranteed delivery times for data communicated between communication devices (210), comprising:

a plurality of communications devices (210), each of said communications devices (210) including a network interface controller (225), including;

    a counting device (370) for generating a signal in response to counting a predetermined number of counts;

    a transmit trigger generator (310) for receiving the signal from said counter (370) and, in response, generating a transmit trigger signal;

    a transmit memory device (320), for storing data to be transmitted;

    a transmit memory manager (315) for receiving the transmit trigger signal from said transmit trigger generator (310) and, in response, directing at least a portion of said data stored in said memory device (320) to a transmission device (325) for transmission of said data;

    a receive trigger generator (350) for receiving the signal from said counter and, in response, generating a receive trigger signal;

    a receive memory device (340), for storing received data;

and

    a receive memory manager (335) for receiving the receive trigger signal from said receive trigger generator (350) and, in response, directing received data to a location within said receive memory device (340);

    a network manager (235) for communicating global information among said plurality of communications devices (210); and

    a synchronization device (230) for generating a global timing schedule (600) for synchronizing the communication between said communications devices (210), wherein in response to at least one trigger, data communicated between the plurality of communication devices (210)

in said asynchronous network (200) is transmitted and received according to said global timing schedule (600).

Support for the elements of claim 19 can be found at least from the following sections of Appellants' specification: page 6, line 6 – page 7, line 3; page 7, line 26 – page 14, line 6; page 15, line 7 – page 16, line 19; and Figs. 2 and 4-5.

**Grounds of Rejection to be Reviewed on Appeal**

Claims 1-10 are rejected under 35 U.S.C. §102(e) as being anticipated by Ofek (US Patent No. 6,735,199, hereinafter “Ofek ‘199”).

Claims 11-23 are rejected under 35 U.S.C. §102(e) as being anticipated by Ofek et al. (US Patent No. 6,973,090, hereinafter “Ofek ‘090”).

Claim 24 is rejected under 35 U.S.C. §103(a) as being unpatentable over Ofek’090 in view of Ofek ‘199.

## Arguments

### Rejection Under 35 U.S.C. §102

#### Claims 1-10

Claims 1-10 are rejected under 35 U.S.C. §102(e) as being anticipated by Ofek '199. The rejection is traversed.

In general, Ofek '199 is directed to a method and a system for switching and forwarding data packets over a packet switching network. More specifically, to provide deterministic quality of service guarantees, the disclosed system and method utilize a global common time reference, which is either obtained from an external source (e.g., Global Positioning System) or generated and distributed internally. The common time reference is used to define time intervals, such as time frames, for transferring data packets. In particular, the Ofek '199 system includes plurality of switches, where each switch has a pre-defined subset of predefined time frames during which the data packets are transferred in the switch and a pre-defined subset of the pre-defined time frames during which the data packets are transferred out of the switch (see e.g., col. 10, line 53 – col. 12, line 5). However, Ofek '199 does not teach or suggest at least one trigger, generating at least one trigger, or transmitting and receiving data in response to such a trigger, as recited in Appellants' independent claim 1.

Asserting that the above named elements of Appellants' claim 1 are taught by Ofek '199, the Examiner cites the following portion:

“A common time reference signal is coupled to each of the switches, and a time assignment controller assigns selected predefined time frames for transfer into and out from each of the respective switches responsive to the common time reference signal. Each communications link may use a different time frame duration generated from the common time reference signal.

For each switch, there is a first predefined time frame and a first predefined wavelength within which a respective data packet is transferred into the respective switch, and a second predefined time frame and a second predefined wavelength within which the respective data packet is forwarded out of the respective switch, wherein the first and second predefined time frames may have different durations. The time assignment provides consistent fixed time intervals between the input to and output from the virtual pipe” (Ofek '199, col. 11, lines 49–65) (emphasis added).

In particular, the Examiner reasons that a trigger is an application or device that activates or releases or causes something to happen, and thus, action of assigning selected predefined time frames for transmitting and receiving data from each switch responsive to the common time reference has “the same function” as Appellants’ action of transmitting and receiving data according to the global timing schedule in response to a generated trigger (see Final Office Action, pages 2 – 3). Appellants believe that such an interpretation of Ofek ‘199 is incorrect.

The Examiner equates the common reference time of Ofek ‘199 to Appellants’ global timing schedule (see Final Office Action, page 3). A plain meaning of a “schedule” is a reference (plan) that includes sequence of operations (actions, events, or the like) and time allotted for each such operation (action, event, or the like) indicating when the operation (action, event, or the like) should occur. Therefore, action of assigning the selected pre-defined time frames for transmitting and receiving data from each switch is actually an action of generating the common reference time of Ofek ‘199. Otherwise, the common reference time may not be considered to be a schedule.

However, Appellants’ claim 1 does not merely recite generating a global time schedule, but includes additional steps of:

- generating at least one trigger; and
- in response to a generated trigger, transmitting and receiving data according to the global timing schedule,

which are absent from Ofek ‘199. Appellants’ “global timing schedule” and “trigger” are two distinct elements. For example, in one of the embodiments of the Appellants’ invention, the global timing schedule is generated at regulated intervals and is a dynamic parameter whose total time duration and interval time may be adjusted according to the latency desired in a specific network (Appellants’ Specification, see e.g., page 11, lines 20 - 27). Only after the global timing has been generated, counters synchronized to a specific count, and the counters counted to a predetermined count is at least one trigger generated (Appellants’ Specification, see page 11, line 28 – page 12, line 6).

For example, in one embodiment of the Appellants’ invention, a generated trigger may be operative for causing transmission of data stored in any section of transmitting memory allowing for optimizing of the bandwidth utilization. As described in the

Appellants' Specification, if an Ethernet terminal, e.g., if a first terminal 210<sub>1</sub> is transmitting data to another Ethernet terminal, e.g., a fourth terminal 210<sub>4</sub>, during a first time slot of the global timing schedule, a trigger may be implemented during the first time slot to cause transmission of data from an Ethernet terminal that is not in communication with the first terminal 210<sub>1</sub>, such as a second terminal 210<sub>2</sub> to another available Ethernet terminal, such as a third terminal 210<sub>3</sub> (Appellants' Specification, see e.g., page 11, lines 1 – 14, Fig. 2)

Anticipation requires the disclosure in a single prior art reference of each and every element of the claimed invention arranged as in the claim. Ofek '199 and the cited portion in particular merely describe that the predefined time frames within a repeating time cycle are assigned to switches. The time cycles repeat, the pre-assigned frames repeat, and switches assigned to frames operate in a mode consistent with such a repetition. However, as described, the Ofek '199 arrangement does not involve or depend upon generating triggers to cause transmitting or receiving data, and thus, fails to teach or suggest each and every element of Appellants' independent claim 1. Accordingly, independent claim 1 is not anticipated by Ofek '199.

Because all of the dependent claims depending directly and indirectly from independent claim 1 include all the limitations of independent claim 1, each such dependent claim is also not anticipated by Ofek '199. Accordingly, Appellants' claims 1-10 are allowable under 35 U.S.C. §102.

Therefore, the rejection of claims 1 – 10 should be withdrawn.

### Claims 11-23

Claims 11-23 are rejected under 35 U.S.C. §102(e) as being anticipated by Ofek '090. The rejection is traversed.

In general, Ofek '090 is directed to a method and a system for switching and forwarding data packets over a packet switching network. More specifically, Ofek '090 discloses a system utilizing a global common time reference, which is either obtained from an external source (e.g., Global Positioning System) or generated and distributed internally. The common time reference is used to define time intervals, such as time frames, for transferring data packets. The system includes plurality of switches, where

each switch has a pre-defined subset of predefined time frames during which the data packets are transferred in the switch and a pre-defined subset of the pre-defined time frames during which the data packets are transferred out of the switch (see e.g., col. 12, line 58 – col. 13, line 5).

In particular, Ofek '090 discloses a transmission system for coupling of data units from an output port to an input port over a communications channel. The output port includes a transmission delineation controller for providing delimiter signals responsive to the common time reference and a transmitter responsive to the delimiter signals for sending the control information and the data units over the communications channel. The input port comprises a receiver for receiving data, a receiver delineation controller and an alignment subsystem used for storing the data units received from the communications channel and sorting them out according the time frame or sub-time frame during which they were sent out of the output port. The receiver further includes a data unit counter for counting the number of data units received by the receiver (see Fig. 1, see also col. 20, lines 35 – 57).

However, Ofek '090 fails to disclose each and every element of the claimed invention, as arranged in independent claim 11. For example, Ofek '090 does not teach or suggest at least “a transmit trigger generator for receiving the signal from said counter and in response, generating a transmit trigger signal” (emphasis added). The Examiner interprets that Ofek '090's transmission delineation controller 6011 teaches Appellants' transmit trigger generator, while data unit counter 6023 teaches Appellants' counter (see Final Office Action page 5). Such an interpretation of Ofek is incorrect

Appellants' claim 11 expressly recites that the transmit trigger receives the signal from the counter. However in Ofek '090, the transmission delineation controller 6011 does not receive any signals from the data unit counter 6023. The delineation controller 6011 is a component of the output port 1100, while the data unit counter is a component of the input port 900. Responsive to common time reference, the transmission delineation controller 6011 generates delimiter signals indicating to the serial transmitter 6012 to insert control information in the data flow. (See col. 20, lines 51-53; col. 22 lines 1-4). However, Ofek '090 does not describe that the transmission delineation controller 6011 receives signals from data unit counter 6023. In contrast, because data and signals

are transmitted from the output port 1100 to the input port 900 (see e.g., col. 20, lines 35 – 37, see also Fig. 1, 17 where the data/signal flow is represented by an arrow aimed from the output port towards the input port), it is simply impossible in such an arrangement for the transmission delineation controller 6011 located in the output port 1100 to receive signals from the data unit counter 6023 located in the input port 900. Accordingly, Ofek '090 does not teach or suggest “a transmit trigger generator for receiving the signal from said counter and in response, generating a transmit trigger signal.”

Furthermore, the Ofek '090 reference fails to teach or suggest at least “a transmit memory manager for receiving the transmit trigger signal from said transmit trigger generator, and in response, directing at least portion of said data stored in said memory device to a transmission device for transmission of said data” (emphasis added). The Examiner interprets that Ofek '090's transmitter 6012 teaches Appellants' transmit memory manager and Ofek '090's alignment subsystem 6600 teaches Appellants' transmit memory device (see Final Office Action page 6). Such an interpretation of Ofek '090 is incorrect.

The transmitter 6012 sends the control information and the data units over the communication channel between the output port and input port (see col. 20, lines 40-43). The alignment subsystem 6600 may store data units received from the communication channel (see col. 20, lines 47-48). However, Ofek '090 does not disclose that the transmitter 6012 located in the output port 1100 directs at least a portion of the data units stored in the alignment subsystem 6600 located in the input 900 to a transmission device. To the contrary, Ofek '090 teaches that the alignment subsystem itself sorts the data units, while a delineation controller 6021 co-located with the alignment subsystem in the input port 900, not the transmitter, generates select-in signals enabling the alignment subsystem 6600 to determine which data units should be stored together (see col. 20, lines 49-50; col. 23, line 64 – col. 24, line 4). Accordingly, the Ofek '090 reference fails to teach or suggest at least the “a transmit memory manager for receiving the transmit trigger signal from said transmit trigger generator, and in response, directing at least portion of said data stored in said memory device to a transmission device for transmission of said data.”

Moreover, Ofek '090 does not teach or suggest at least "a receive memory manager for receiving the receive trigger signal from said receive trigger generator and, in response, directing received data to a location within said receive memory device." The Examiner interprets that Ofek '090's receive delineation controller 6021 teaches Appellants' receive trigger generator and Ofek '090's receiver 6022 teaches Appellants receive memory manger. To support this interpretation of Ofek '090, the Examiner relies on the following portion of Ofek '090, "The system depicted in FIG. 1 further comprises a receiver 6022, responsive to the CTR 002, coupled with a delineation controller 6021, responsive to the CTR 002 and the delimiter signals 6040 through 6044..." (see col. 20, line 43 – 46, see also Final Office Action, page 6). The Examiner's interpretation is incorrect.

According to Appellants' claim 11, the receive memory manager receives trigger signal from the trigger generator. Accordingly, if the Examiner interpretation were to be correct, the receiver 6022 must receive trigger signal from the receive delineation controller 6021. However, neither in the cited portion, nor in Fig. 1 does Ofek '090 disclose such an action. In contrast, in Fig. 1 it is clearly shown by arrowed lines that it is the receive delineation controller 6021 that receives various control information from the receiver 6022, not the other way around. Accordingly, Ofek '090 does not teach or suggest at least "a receive memory manager for receiving the receive trigger signal from said receive trigger generator and, in response, directing received data to a location within said receive memory device," as recited in independent claim 11.

Because Ofek '090 fails to teach or suggest at least the above discussed elements of independent claim 11, Ofek '090 does not teach or suggest each and every element of the claimed invention, as arranged in Appellants' independent claim 11. Accordingly, independent claim 11 is not anticipated by Ofek '090 and is allowable under 35 U.S.C. §102. Claim 19 recites relevant limitations similar to those recited in independent claim 11 and, as such, and at least for the same reasons as discussed above, this independent claim also are not anticipated by Ofek '090 and are allowable under 35 U.S.C. §102.

Additionally, regarding claim 19, Ofek '090 does not teach or suggest at least "in response to at least one trigger, data communicated between the plurality of communication devices in said asynchronous network is transmitted and received

according to said global timing schedule.” Similar to Ofek ‘199, the cited portion of Ofek ‘090 merely describes that the predefined time frames within a repeating time cycle are assigned to the switches. The time cycles repeat, the pre-assigned frames repeat, and switches assigned to frames operate in a mode consistent with such a repetition. However, the Ofek ‘199 arrangement does not involve or depend upon generating triggers to cause transmitting or receiving data, and thus, fails to teach or suggest each and every element of Appellants’ independent claim 19.

Because all of the dependent claims depending from the independent claims include all the limitations of the respective independent claim from which they ultimately depend, each such dependent claim is also allowable over Ofek ‘090.

Therefore, the rejection of claims 11 – 23 should be withdrawn.

**Rejection Under 35 U.S.C. §103(a)**

Claim 24 is rejected under 35 U.S.C. §103(a) as being unpatentable over Ofek ‘090 in view of Ofek ‘199. The rejection is traversed.

This ground of rejection applies only to a dependent claim, and is predicated on the validity of the rejection under 35 U.S.C. §102 given Ofek ‘090. Because the rejection under 35 U.S.C. §102 given Ofek ‘090 has been overcome, as described hereinabove, and there is no argument put forth by the Office Action that Ofek ‘199 supplies that which is missing from Ofek ‘090 to render the independent claims anticipated, these grounds of rejection cannot be maintained.

Accordingly, Appellants’ claim 24 is allowable under 35 U.S.C. §103(a). Therefore, the rejection of claim 24 should be withdrawn.

**Conclusion**

Thus, Appellants submit that all of the claims presently in the application are allowable under the provisions of 35 U.S.C. §§102 and 103.

For the reasons advanced above, Appellants respectfully urges that the rejection of claims 1-24 is improper. Reversal of the rejections of the Final Office Action is respectfully requested.

Respectfully submitted,

Dated: 6/30/08



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Eamon J. Wall  
Registration No. 39,414  
Patterson & Sheridan, L.L.P.  
595 Shrewsbury Ave. Suite 100  
Shrewsbury, NJ 07702  
Telephone: (732) 530-9404  
Facsimile: (732) 530-9808  
Attorney for Appellant

## CLAIMS APPENDIX

1. (previously amended) A method for guaranteeing delivery times of data communicated between communications devices of an asynchronous network comprising:

generating a global timing schedule for synchronizing the communication between said communications devices;

generating at least one trigger; and

in response to a generated trigger, transmitting and receiving data according to the global timing schedule.

2. (original) The method of claim 1, wherein said global timing schedule comprises at least one time frame, each of said at least one time frames including at least one time slot, wherein during each of said at least one time slots each of said communications devices may receive data from only one other communications device.

3. (original) The method of claim 2, wherein synchronous data is communicated within each of said time slots.

4. (original) The method of claim 3, wherein data communication according to said global timing schedule is prioritized such that the delivery time of synchronous data does not exceed a maximum latency allowed for said synchronous data.

5. (original) The method of claim 3, wherein each of said at least one time frames further comprises a period of time for the communication of asynchronous data.

6. (original) The method of claim 5, wherein the communication of asynchronous data is performed without undermining conventional Ethernet protocol standards.

7. (original) The method of claim 2, wherein said method comprises a priority of communication during each of said at least one time slots.

8. (original) The method of claim 7, wherein a selected one of said communications devices is given priority for communication during each of said at least one time slots.

9. (original) The method of claim 7, wherein each of said communications devices is given priority for communication during a respective one of said at least one time slots.

10. (original) The method of claim 1, wherein each of said communications devices generates a respective trigger for enabling the transmitting and receiving of data by said communications device according to said global timing schedule.

11. (original) A network interface controller for triggering data communication between communications devices of an asynchronous network having guaranteed delivery times, comprising:

a counting device for generating a signal in response to counting a predetermined number of counts;

a transmit trigger generator for receiving the signal from said counter and, in response, generating a transmit trigger signal;

a transmit memory device, for storing data to be transmitted;

a transmit memory manager for receiving the transmit trigger signal from said transmit trigger generator and, in response, directing at least a portion of said data stored in said memory device to a transmission device for transmission of said data;

a receive trigger generator for receiving the signal from said counter and, in response, generating a receive trigger signal;

a receive memory device, for storing received data; and

a receive memory manager for receiving the receive trigger signal from said receive trigger generator and, in response, directing received data to a location within said receive memory device.

12. (original) The network interface controller of claim 11, wherein said counting device generates a signal in response to counting each of a plurality of predetermined count numbers.

13. (original) The network interface controller of claim 11, further comprising a synchronization device for generating a global timing schedule within which the communication between said communications devices is synchronized, wherein said counting device is set to a predetermined count number in response to a signal from said synchronization device, said signal depicting the start of a time frame of said global timing schedule.

14. (original) The network interface controller of claim 11, wherein said counting device begins counting from a predetermined count number in response to a signal depicting the start of a time frame of a global timing schedule within which the communication between said communications devices is synchronized.

15. (original) The network interface controller of claim 11, wherein said transmit trigger generator, said transmit memory device, said receive trigger generator and said receive memory device are partitioned into different sections.

16. (original) The network interface controller of claim 15, wherein data to be transmitted is stored within respective sections of said transmit memory device such that respective triggers generated by respective sections of said transmit trigger device cause data in respective sections of said transmit memory device to be transmitted.

17. (original) The network interface controller of claim 15, wherein respective triggers generated by respective sections of said receive trigger device cause received data to be stored in respective sections of said receive memory device.

18. (original) The network interface controller of claim 15, wherein the sections of said transmit trigger generator, said transmit memory device, said receive trigger

generator and said receive memory device are used to transmit data to and receive data from respective ones of said communication devices.

19. (original) An asynchronous network having guaranteed delivery times for data communicated between communication devices, comprising:

a plurality of communications devices, each of said communications devices including a network interface controller, including;

a counting device for generating a signal in response to counting a predetermined number of counts;

a transmit trigger generator for receiving the signal from said counter and, in response, generating a transmit trigger signal;

a transmit memory device, for storing data to be transmitted;

a transmit memory manager for receiving the transmit trigger signal from said transmit trigger generator and, in response, directing at least a portion of said data stored in said memory device to a transmission device for transmission of said data;

a receive trigger generator for receiving the signal from said counter and, in response, generating a receive trigger signal;

a receive memory device, for storing received data; and

a receive memory manager for receiving the receive trigger signal from said receive trigger generator and, in response, directing received data to a location within said receive memory device;

a network manager for communicating global information among said plurality of communications devices; and

a synchronization device for generating a global timing schedule for synchronizing the communication between said communications devices, wherein in response to at least one trigger, data communicated between the plurality of communication devices in said asynchronous network is transmitted and received according to said global timing schedule.

20. (original) The asynchronous network of claim 19, wherein each of said counting devices generates a signal in response to counting each of a plurality of predetermined count numbers.
21. (original) The asynchronous network of claim 20, wherein non-conflicting ones of said plurality of communications devices generate a trigger in response to said signal generated by a respective counter for each predetermined count number.
22. (original) The asynchronous network of claim 19, wherein said global timing schedule comprises a recurring time frame.
23. (original) The asynchronous network of claim 22, wherein a transmit trigger signal generated by a communications device generates a time slot in a time frame of said global timing schedule in which said communications device may transmit and receive data.
24. (original) The asynchronous network of claim 19, wherein data communication according to said global timing schedule is prioritized such that the delivery time of synchronous data does not exceed a maximum latency allowed for said synchronous data.

**EVIDENCE APPENDIX**

None

**RELATED PROCEEDINGS APPENDIX**

None